

## CLAIMS

What is claimed is:

1. A digital delay line for use in a 3D audio sound system,  
5 comprising:  
*sub A*  
a first delay module providing a choice of any delay within a  
first resolution; and  
a second delay module in series with said first delay module,  
said second delay module providing a choice of any of a plurality of  
10 additional fractional delays, each of said additional fractional delays being  
less than said first resolution.
2. The digital delay line for use in a 3D audio sound system  
according to claim 1, wherein said first delay module comprises:  
15 a first-in, first out buffer.
3. The digital delay line for use in a 3D audio sound system  
according to claim 1, wherein said second delay module comprises:  
a choice of any one of a plurality of polyphase filters, each of  
20 said polyphase filters providing an additional fraction delay less than said  
first resolution.
4. The digital delay line for use in a 3D audio sound system  
according to claim 1, further comprising:  
25 a localization control module comprising an interaural time  
delay look-up table associating desired sound source locations with a  
particular interaural time delay.

5. The digital delay line for use in a 3D audio sound system according to claim 4, wherein said localization control module further comprises:

an integer and fractional delay selector adapted to  
5 determine a first time delay for use by said first delay module and said additional fractional delay for use by said second delay module.

6. The digital delay line for use in a 3D audio sound system according to claim 1, wherein:

10 said first resolution is based on a sampling rate of a digital audio signal.

7. A method for providing an interaural time delay in a digital 3D sound system, comprising:

15 selecting one of a plurality of available first time delays having a first resolution between each of said plurality of available first time delays;

20 additionally selecting one of a plurality of available second time delays, each of said plurality of available second time delays being less than said first resolution; and

25 adding said selected first time delay and said second time delay to provide a desired interaural time delay.

8. The method for providing an interaural time delay in a digital 3D sound system according to claim 7, wherein:

25 said desired interaural time delay relates to a desired interaural time delay for one ear of a listener; and

30 said first time delay relates to a desired interaural time delay for a second ear of said listener.

9. The method for providing an interaural time delay in a digital 3D sound system according to claim 7, wherein:

    said plurality of available time delays are based on a sampling rate of a digital audio signal.

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10. The method for providing an interaural time delay in a digital 3D sound system according to claim 7, further comprising:

    fixing a first interaural time delay with respect to a first ear of a listener; and

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    providing said desired interaural time delay with respect to a second ear of said listener.

11. Apparatus for providing an interaural time delay in a digital 3D sound system, comprising:

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    means for selecting one of a plurality of available first time delays having a first resolution between each of said plurality of available first time delays;

    means for additionally selecting one of a plurality of available second time delays, each of said plurality of available second time delays being less than said first resolution; and

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    means for adding said selected first time delay and said second time delay to provide a desired interaural time delay.

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12. The apparatus for providing an interaural time delay in a digital 3D sound system according to claim 11, wherein:

    said desired interaural time delay relates to a desired interaural time delay for one ear of a listener; and

    said first time delay relates to a desired interaural time delay for a second ear of said listener.

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13. The apparatus for providing an interaural time delay in a digital 3D sound system according to claim 11, wherein:

    said plurality of available time delays are based on a sampling rate of a digital audio signal.

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14. The apparatus for providing an interaural time delay in a digital 3D sound system according to claim 11, further comprising:

    means for fixing a first interaural time delay with respect to a first ear of a listener; and

10       means for providing said desired interaural time delay with respect to a second ear of said listener.

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